

REMARKS

The present application was filed on February 6, 2004 with claims 1-24. In the outstanding Office Action dated June 28, 2005, the Examiner has: (i) objected to claim 2; and (ii) rejected claims 1-24 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,961,821 to Drake et al. (hereinafter “Drake”).

In this response, claim 8 has been canceled without prejudice and claims 1, 4, 5, 9-11, 14 and 16-24 have been amended. Furthermore, claim 25 has been added. Applicants traverse the objection to claim 2 for at least the reasons set forth below. Applicants respectfully request reconsideration of the present application in view of the above amendments and the following remarks.

An acknowledgment of the receipt of formal drawings filed on March 29, 2004 in the present application is respectfully requested.

Claim 2 has been objected to by the Examiner as containing improper Markush type language. Specifically, the Examiner contends that claim 2 uses the term “comprising” instead of “consisting of” (Office Action; page 2, paragraph 1). Applicants respectfully disagree with this contention. Claim 2 is not a Markush claim and therefore does not require Markush type claim language. Rather, the etching process recited in claim 1 contemplates various etching methodologies, of which wet etching and reactive ion etching (set forth in claim 2) are included. Accordingly, Applicants respectfully request withdrawal of the objection to claim 2.

Claims 1-24 stand rejected under §102 as being anticipated by Drake. With regard to independent claims 1, 14, 18 and 22, which are of similar scope, the Examiner contends that Drake discloses all of the elements set forth in these claims. Claims 1, 14, 18 and 22 have been amended in a manner which is believed to further distinguish the claimed invention from the prior art of record. Specifically, claims 1, 14, 18 and 22, as amended, require that the integrated circuit die include at least one chamfer “joining first and second adjacent sides of the integrated circuit die, the chamfer having an upper surface which is angled relative to the first and second adjacent sides.” The prior art fails to teach or suggest at least this feature of the claimed invention. Support for this amendment may be found, for example, in the present specification, on page 5, lines 3-8, and in FIG. 2 of the drawings.

Drake relates to “methods of precisely forming through holes in (100) silicon wafer by orientation dependent etching” (Drake; column 1, lines 7-9). While Drake may disclose forming chips having precisely defined butt edges without using any mechanical steps (Drake; column 6, lines 62-64), the methodology disclosed by Drake is directed to the perimeter edges of the die rather than to the corners of the die. Consequently, the methodology taught by Drake does not provide any mechanism for relieving post-fabrication damage at the corners of the die, as is often encountered, for example, during die attach. In this regard, Applicants submit that forming a die having a beveled perimeter edge is not analogous to forming a die having a chamfer joining two adjacent sides of the die, as required by the claimed invention. The chamfer effectively eliminates the sharp corner otherwise formed where two adjacent sides of the die meet. At stated in the present specification (see, e.g., page 5, lines 1-2), the corners of the die represent high stress points which are often damaged during a post fabrication process such as die attach.

For at least the reasons set forth above, Applicants submit that claims 1, 14, 18 and 22, as amended, are believed to be patentable over the prior art. Accordingly, favorable reconsideration and allowance of these claims are respectfully solicited.

With regard to claims 2-7 and 9-13, which depend from claim 1, claims 15-17, which depend from claim 14, claims 19-21, which depend from claim 18, and claims 23 and 24, which depend from claim 22, Applicants assert that these claims are also patentable over the prior art of record by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Furthermore, one or more of these claims define additional patentable subject matter in their own right.

For example, claim 5, and similarly claims 16, 19 and 24, further define the angle of the upper surface of the chamfer as being “controlled, at least in part, by selectively varying one or more characteristics of the etching process.” While the Examiner contends that Drake discloses such a feature at column 4, line 49 through column 6, line 32, and in FIGS. 9A-9E (Office Action; page 3, paragraph 3), Applicants respectfully disagree with this contention. The only mention of any “angle” in Drake seems to appear at column 5, lines 1-6, where Drake describes the angle of the (111) plane of crystalline silicon as being 54.7 degrees relative to the (100) plane. Drake also states that “[t]he present invention makes use of the selection of an etchant which etches through the (100)

Application Serial No. 10/773,614

planes much faster than the (111) planes” (Drake; column 5, lines 4-6). However, Drake fails to teach or suggest any mechanism for controlling an angle of the etched surface, and more particularly fails to disclose controlling an angle of the upper surface of the chamfer by selectively varying one or more characteristics of the etching process, as recited in the subject claims, as amended.

Likewise, claim 11, and similarly claim 21, further define the angle of the upper surface of the chamfer as being “substantially matched to an angle of a sidewall of a die collet configurable for receiving the die.” Contrary to the Examiner’s contentions in this regard, Drake fails to teach or even remotely suggest matching the angle of the etched butt edges to the sidewall of a die collet. In fact, there is no mention in Drake of a die collet or other die handling apparatus at all.

For at least the reasons given above, Applicants submit that claims 2-7, 9-13, 15-17, 19-21, 23 and 24 are patentable over the prior art of record, not merely by virtue of their dependency from their respective base claims, but also in their own right. Accordingly, favorable reconsideration and allowance of these claims are respectfully requested.

Claim 25 has been added which further defines the shape of the chamfer in the die. This claim, which depends from claim 1, is believed to be patentable over the prior art of record by virtue of its dependency from claim 1, which is believed to be patentable for at least the reasons given above. Furthermore, since Drake fails to teach or suggest the formation of a chamfer in an integrated circuit die, and furthermore fails to specify a shape of the chamfer as being substantially triangular, claim 25 is believed to define additional patentable subject matter in its own right. Accordingly, favorable consideration and allowance of claim 25 is respectfully solicited.

Application Serial No. 10/773,614

In view of the foregoing, Applicants believe that pending claims 1-25 are in condition for allowance, and respectfully request withdrawal of the §102 rejection.

Respectfully submitted,



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